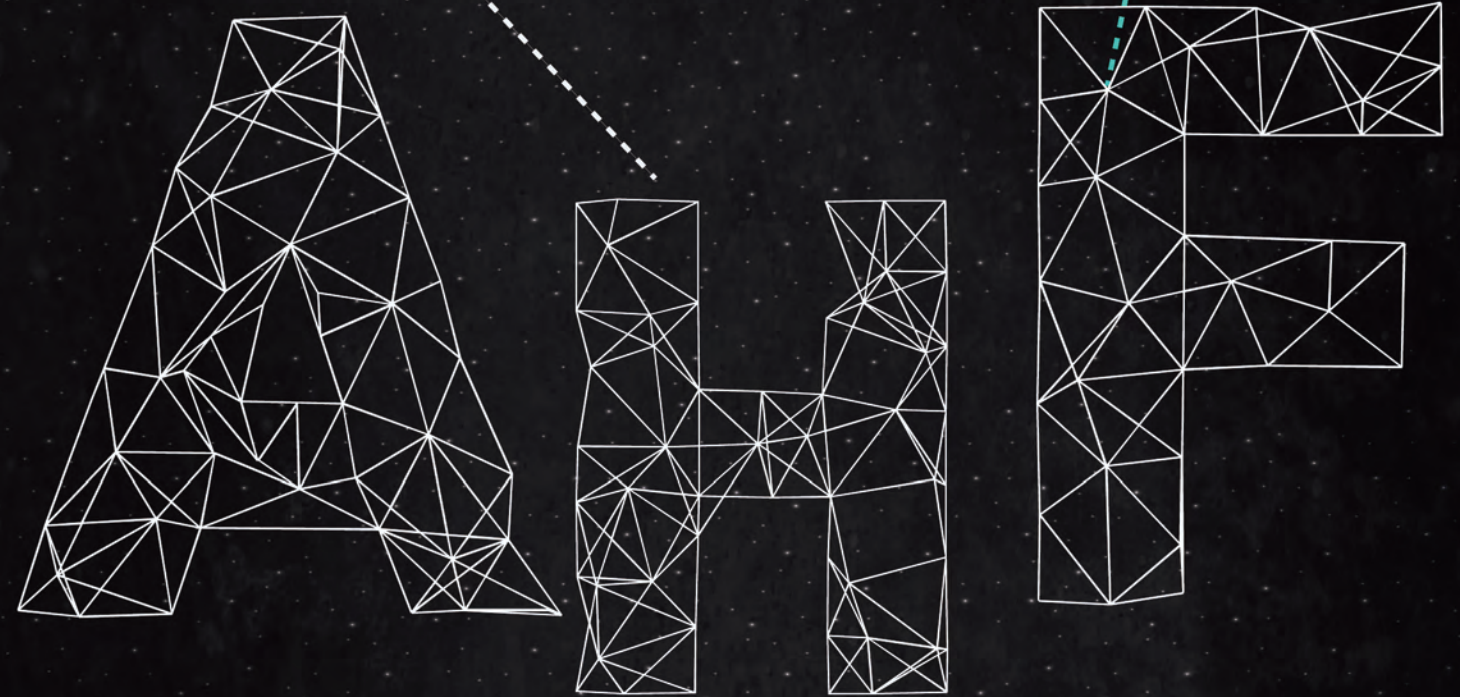




**Sinexcel**

Power Quality

Energy Efficiency



Flexible Alternative Current  
Harmonic Mitigation

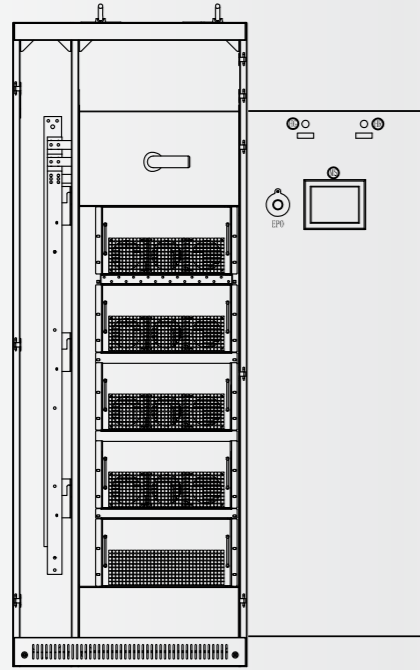
Inverter Based PQ  
Active Harmonic Filter

**Modular  
Solution**

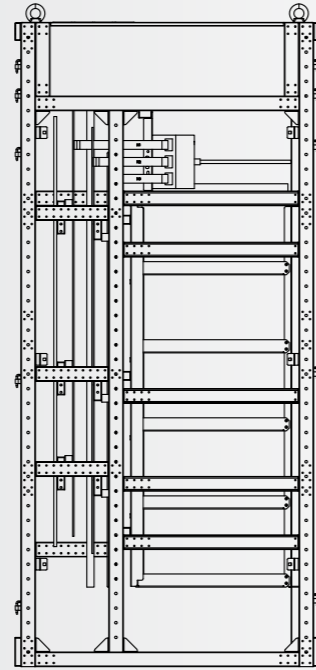




**Front View**



**Left Side View**





# NONLINEAR LOADS

Different compensation model for different loads



## NONLINEAR LOADS

### INDUSTRIAL EQUIPMENT

Induction furnaces, static converters, VFD, welding machines

### OFFICE EQUIPMENT

Computers, servers, printers

### HOUSEHOLD APPLIANCES

Fluorescent lightings, TV light, dimmers, microwave ovens.

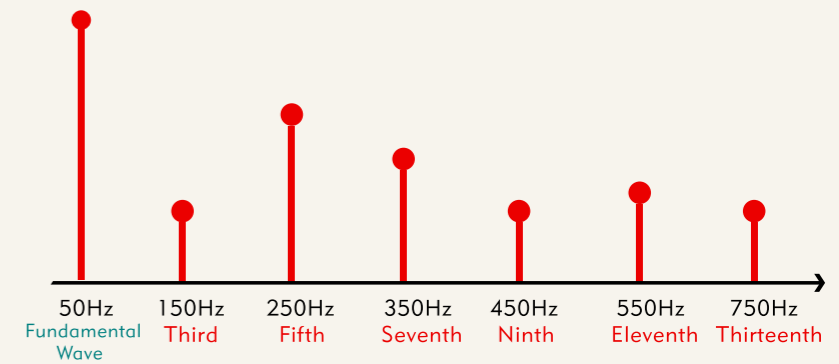
### UNINTERRUPTIBLE POWER SUPPLIES (UPS)

## WHY HARMONIC HURT YOUR SYSTEM?

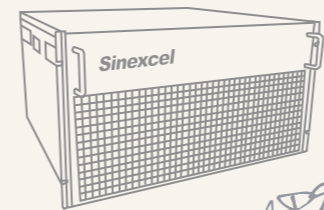
Higher harmonic current would lead to capacitors' inner swelling, oil spilling and fire risk, severe discharge, flashover and overheat, resulting in over-current and over-voltage, accelerating the aging of the capacitor dielectric, lower safety levels of installations, which cause the unnecessary financial losses.

Higher harmonic orders cause more serious distortion on the grid voltage and current, which will increase the transformer copper and iron losses or load imbalance.

Affect the equipment efficiency and occupy unnecessary grid capacity. Overheating of equipment and shortening the lifetime.



Electrical network with poor power quality results in financial loss and safety concerns. Good power quality not only improves the efficiency of the energy by decreasing the loss of electrical equipment, but also guarantees that the power system could support stable and healthy operation. It becomes more and more convenient for us both in daily life and industry because of fast developing technology, which is also accompanied with the development of non-linear loads.



AAI Inverter Base

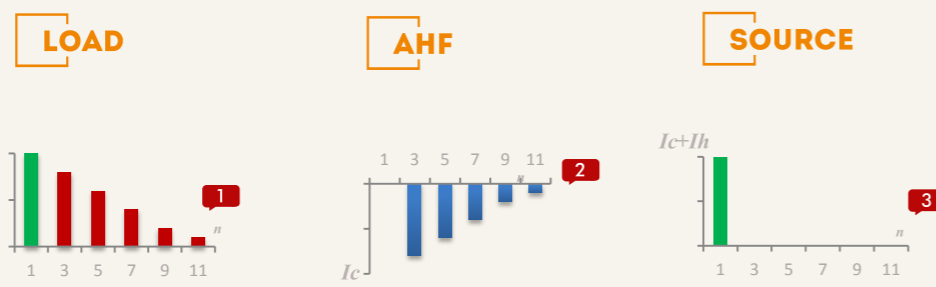
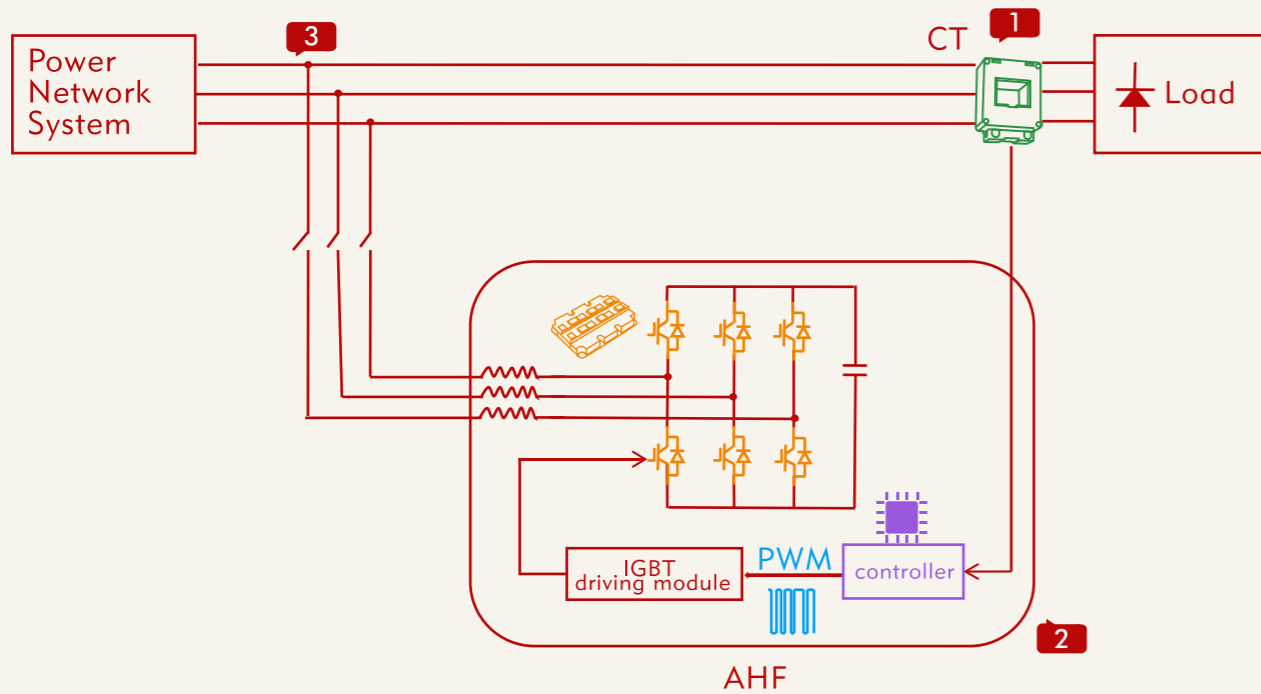


# AHF WORKING PRINCIPLE

Optimize your harmonic compensation efficiency

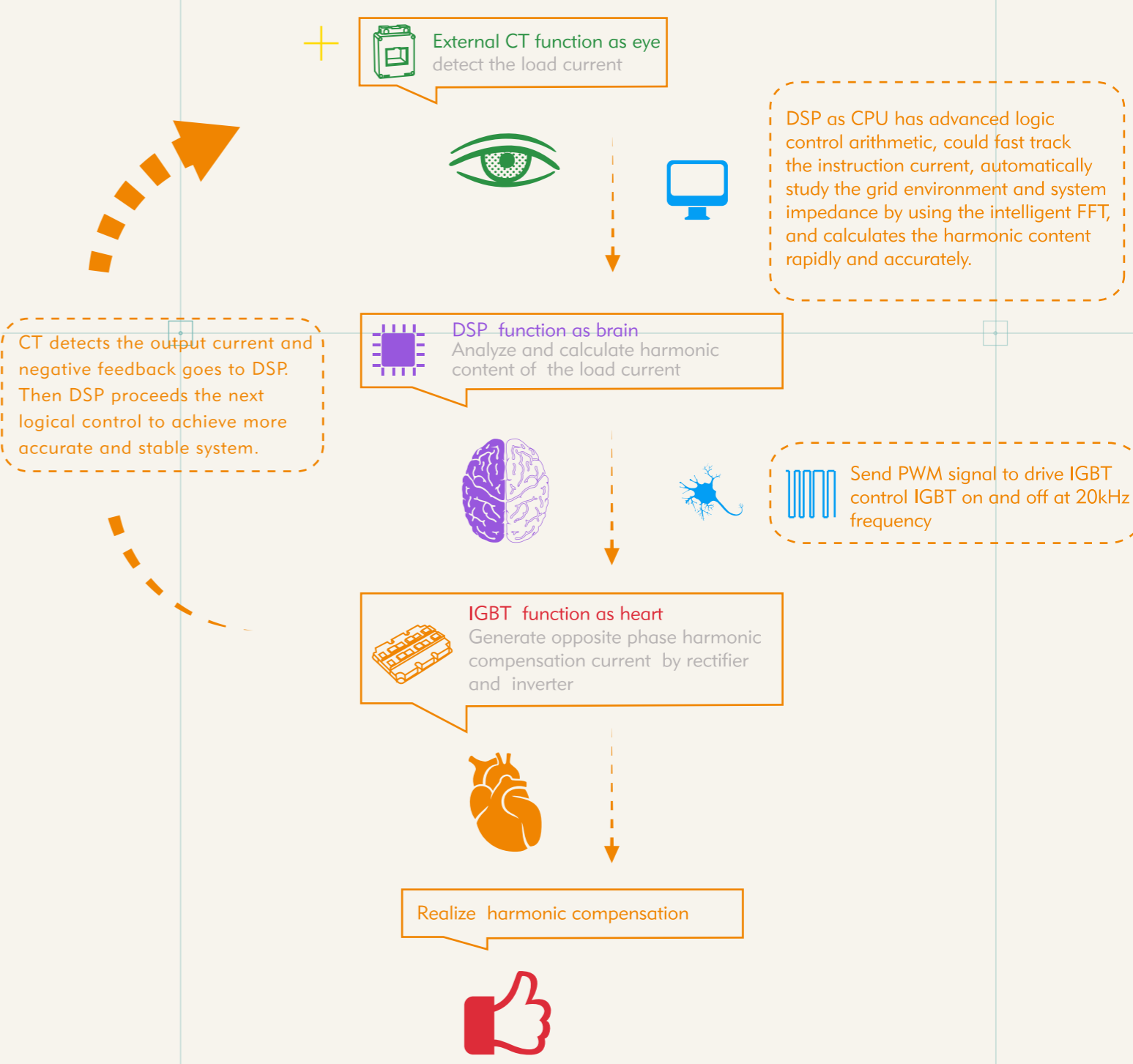
- Flexible Alternative Current
- Harmonic Mitigation
- Inverter Based PQ
- Active Harmonic Filter

External CT detect the load current, DSP as CPU has advanced logic control arithmetic, could fast track the instruction current, divides the load current into active power and reactive power by using the intelligent FFT, and calculates the harmonic content rapidly and accurately. Then sends PWM signal to internal IGBT's driver board to control IGBT on and off at 20KHZ frequency. Finally generates opposite phase compensation current on inverter induction, at the same time CT also detects the output current and negative feedback goes to DSP. Then DSP proceeds the next logical control to achieve more accurate and stable system.



SPECTRUM

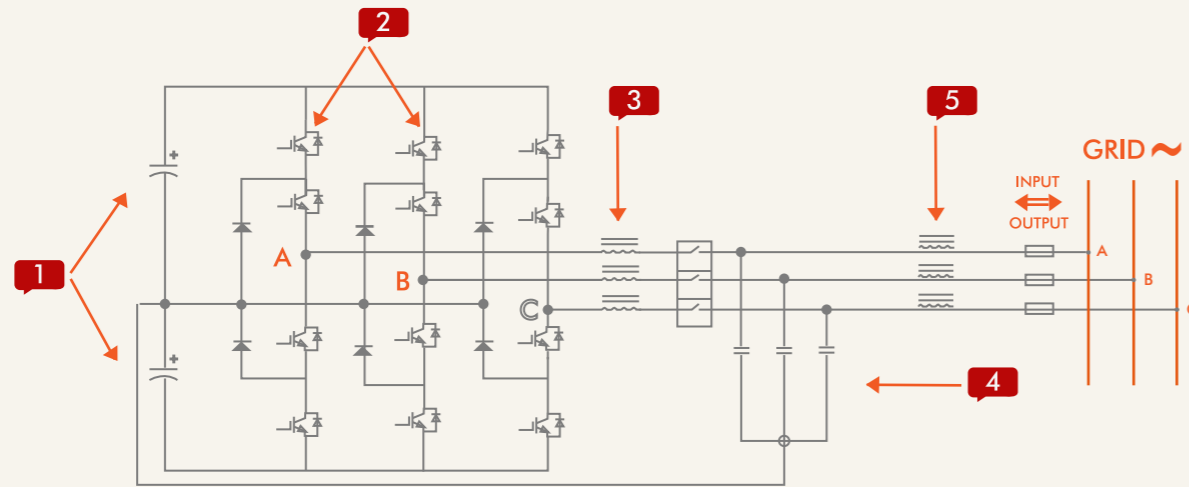
WAVEFORM





# UNDERSTAND HOW AHF COMPENSATE HARMONIC

Optimize your harmonic compensation efficiency



## DC BUS CAPACITOR

AC to DC rectifier storage

## IGBT

Controlled by DSP software algorithm, IGBT on-off timing selection and length could control inverter to generate a harmonic current.

IGBT generates square wave, it's outline is like sinusoid.

## INVERTER INDUCTION

The square wave will convert into triangular wave, which is more like sinusoid after inverter inductor.

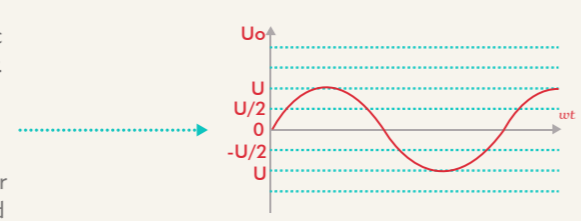
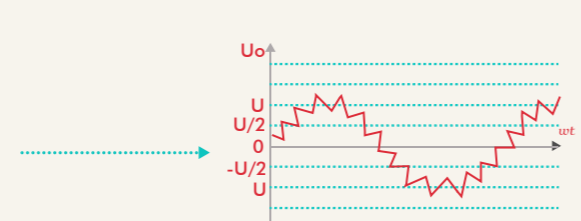
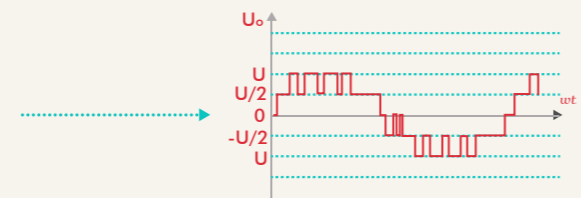
## LCL FILTER CIRCUIT

### LC FILTER CIRCUIT

LC filter circuit filter out impurities of the harmonic. High frequency inductor The rest of high frequency harmonic will be filtered by the high frequency inductor.

## HIGH FREQUENCY INDUCTOR

Both for filtering. The combination of LC filter circuit and high frequency inductor are called LCL filter circuit



# KEY FEATURES AND BENEFITS

Impressive compensation effect of AHF

## MODULAR DESIGN

Ultra-compact design, wall and rack mount installation, easy to use in new or exiting switch room upgraded

Module structure with highest reliability of system

3P4W and 3P3W adapted by same modules, same harmonic mitigation capability

## INTELLIGENT FFT

Unique intelligent FFT algorithm automatically study the electrical system impedance, to prevent system from resonance, high system reliability

Real time electrical system resonance monitor and management

## GRAPHICAL USER INTERFACE

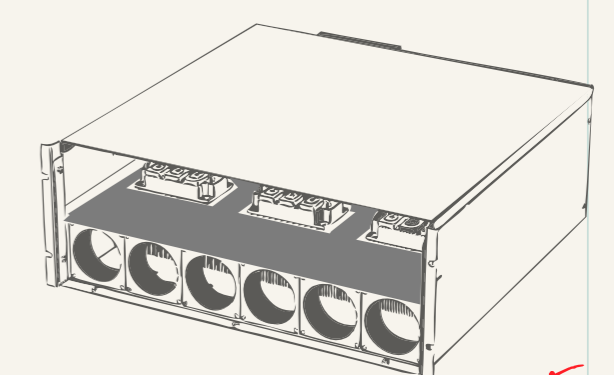
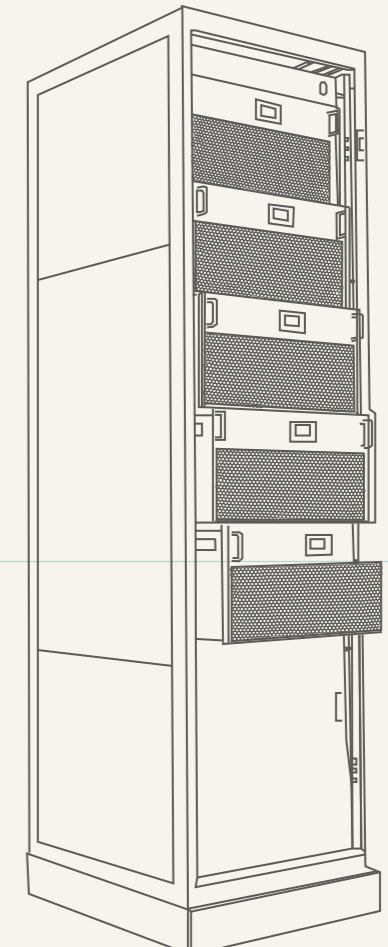
Module 4.3 inch HMI, cabinet 7 inch HMI central

Display electrical system voltage, current, frequency, before and after THDi, Apparent/Active/Reactive power, etc

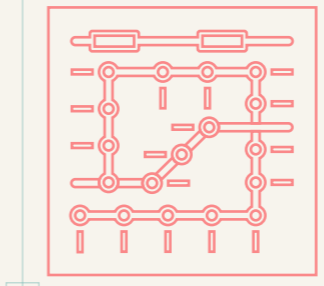
Display before and after waveform, spectrum in same page with clearly comparison

## MAINTENANCE FREE DESIGN

Independent air flow, separate electronic components from air flow. Free of dust cleaning maintenance requirement, improve product reliability



*AHF Cabinet*





INVERTER



Specification

Items
Rated input
Power grid frequency
Parallel quantities
Efficiency
Power grid structure
CT
Circuit topology
Rated capacity
Harmonic compensation
Reactive power compensation
Unbalance compensation
Control algorithm
Operation mode
Filtering range
Filtering order
Filtering degree
Filter performance
Reaction time
Overall response time
Target power factor
Switching frequency
Cooling air requirement
Noise level
Communications ports
Communications protocols
Module display interface
Protection functions
monitoring alarm
Fault alarm
Mounting type
Dimensions (W x D x H)mm
Net weight
Color
Altitude
Ambient temperature
Relative humidity
Protection class
Qualifications
Standards compliance

400V				
Sinexcel AHF 005/010/015	Sinexcel AHF 025/035	Sinexcel AHF 050/060	Sinexcel AHF075/ 100	Sinexcel AHF 150/300
System parameters				
380V/415V(228V~456V)				
50/60Hz(range: 45Hz~62.5Hz)		50/60Hz(range: 45Hz~62Hz)		
unlimited				
≥97%				
3P3W, 3P4W				
50/5~10000/5		150/5~10,000/5		
3-level				
Performance indicators				
5/10/15A	25A/35A	50A/60A	75A/100A	150A/300A
Available				
Available				
Available				
FFT,Intelligent FFT, and instantaneous reactive power				
12 combination, set up priority				
2 <sup>nd</sup> to 61 <sup>th</sup> orders		2 <sup>nd</sup> to 50 <sup>th</sup> orders		
2 <sup>nd</sup> to 61 <sup>th</sup> orders		2 <sup>nd</sup> to 50 <sup>th</sup> orders		
2 <sup>nd</sup> to 61 <sup>th</sup> orders		2 <sup>nd</sup> to 50 <sup>th</sup> orders		
>95%				
<15μs		<50μs		
5ms		<5ms		
Adjustable from -1 to +1				
average 20kHz,maximum 35kHz				
90KHz				
44L/Sec	75L/Sec	151L/Sec	300L/Sec	405L/Sec
<55dB		<56dB		
Communications and monitoring capabilities				
RS485		RS485, and Ethernet port		
Modbus		Modbus (RTU)		
WIFI display		4.3-inch HMI (module), 7-inch HMI(central monitor), LED		
over-voltage protection, under-voltage protection, short-circuit protection, inverter bridge inverse protection, over-compensation protection, and so on				
Available				
Available, at most 500 alarm records				
Mechanical properties				
Wall-mounted/Rack-mounted		Wall-mounted/Rack-mounted/Cabinet		
400*325*44.5(Rack-mounted)		440*490*150 (Rack-mounted)	440*590*190 (Rack-mounted)	500*600*190/440*600*230 (Rack-mounted)
400*44.5*325(Wall-mounted)		440*150*470 (Wall-mounted)	440*190*610 (Wall-mounted)	500*190*584 /440*234*625 (Wall-mounted)
				500*560*269/500*650*350 (Rack-mounted)
				500*286*557/500*350*650 (Wall-mounted)
4.98kg		18kg	35kg	36kg
48kg/70kg				
Black/gray/blue/orange/red (sand blast)		Black		
Environment requirements				
≤1500 m; Between 1500 m to 4000 m, according to GB/T3859.2, the power decreases by 1% for every additional 100 m.				
-10°C~40°C (may derate capacity if ambient temperature exceeds 45°C)				
5% to 95%, non-condensing				
IP20				
Related qualifications and standards				
CE, IEEE 61000,				
IEEES19、ER G5/4				



INVERTER

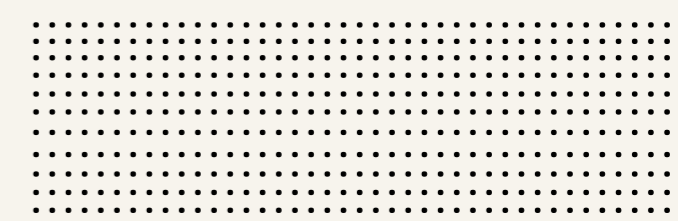


North America  
& 690V Grid voltage



Specification

Items	208V/480V	600V	690V
	SinexcelAHF 25/35/50 60/75/90(USA)	SinexcelAHF 25/35/50 60/75/90(Canada)	SinexcelAHF 25/35/50 60/75/90
<b>System parameters</b>			
Rated input	480V(384V~552V)	600V(420V~690V)	690V(483V~793V)
Power grid frequency	50/60Hz(range: 45Hz~62Hz)		
Parallel quantities	unlimited		
Efficiency	≥97%		
Power grid structure	3P3W, 3P4W		
CT	150/5 ~ 10,000/5		
Circuit topology	3-level		
<b>Performance indicators</b>			
Rated capacity	25/35/50/60/75/90A		
Harmonic compensation	Available		
Reactive power compensation	Available		
Unbalance compensation	Available		
control algorithm	Intelligent FFT,FFT, and instantaneous reactive power algorithm		
Filtering range	2 <sup>nd</sup> to 50 <sup>th</sup> orders		
Filtering order	2 <sup>nd</sup> to 50 <sup>th</sup> orders		
Filtering degree	2 <sup>nd</sup> to 50 <sup>th</sup> orders		
Filter performance	>95%		
Reaction time	<50μs		
Overall response time	<5ms		
Target power factor	Adjustable from -1 to +1		
Switching frequency	20kHz		
Cooling air requirement	359L/Sec		
Noise level	<65dB		
<b>Communications and monitoring capabilities</b>			
Communications ports	RS485, and Ethernet port (RJ45)		
Communications protocols	Modbus (RTU)		
Module display interface	7-inch LCD touch screen(rack-mounted); 4.3-inch LCD touch screen(wall-mounted)		
Protection functions	over-voltage protection, under-voltage protection, short-circuit protection, inverter bridge inverse protection, over-compensation protection, and so on		
monitoring alarm	Available		
Fault alarm	Available, at most 500 alarm records		
<b>Mechanical properties</b>			
Mounting type	Wall-mounted/Rack-mounted		
Dimensions (W x D x H) mm	500*590*180/544*640*250(Rack-mounted) 500*184*627/504*253*640(Wall-mounted)		
Net weight	66kg		
Color	Black		
<b>Environment requirements</b>			
Altitude	≤1500 m; Between 1500 m to 4000 m, according to GB/T3859.2, the power decreases by 1% for every additional 100 m.		
Ambient temperature	-20°C~40°C (may derate capacity if ambient temperature exceeds 45°C)		
Relative humidity	5% to 95%, non-condensing		
Protection class	IP20		
<b>Related qualifications and standards</b>			
Qualifications	CE, cETLus (CSA C22.2,UL508), IEEE 61000 , UL		
Standards compliance	IEEES19 , ER G5/4		





POWER  
E  
R  
E  
N  
T



400V



400V



○ 25A/35A wall/rack 440\*150\*47mm<sup>3</sup> 18kg

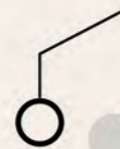


○ 50A/60A wall/rack 440\*190\*540 mm<sup>3</sup> 35kg  
75A wall/rack 500\*190\*560 mm<sup>3</sup> 36kg  
100A wall/rack 440\*230\*600 mm<sup>3</sup> 36kg

POWER  
EFFECTIVE  
AVANTAGE



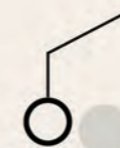
400V



150A wall/rack 500\*470\*270mm<sup>3</sup> 48kg



480V  
600V  
690V



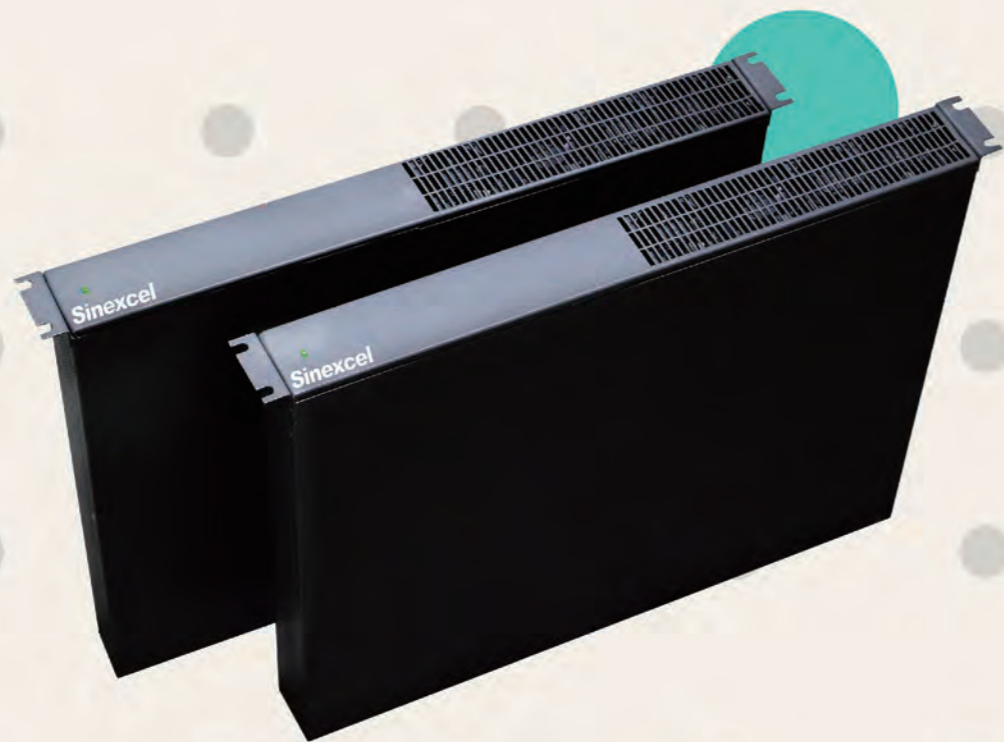
50A/90A  
500\*590\*180/544\*640\*250(Rack-mounted)  
500\*184\*627/504\*253\*640(Wall-mounted)



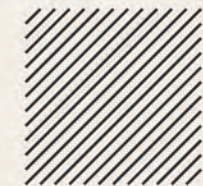
POWER  
TRANSFORMER  
CIRCUIT BREAKER  
FUSES  
CIRCUIT BREAKER  
FUSES  
CIRCUIT BREAKER  
FUSES  
CIRCUIT BREAKER  
FUSES  
CIRCUIT BREAKER  
FUSES



400V



5A/10A/15A Rack 400\*325\*44.5 mm<sup>3</sup> 4.98kg



400V



**Flexible Engineering Cabinet**

- Flexible dimension  
600\*1000\*2200mm<sup>3</sup>, 800\*1000\*2200mm<sup>3</sup>, 800\*800\*2200mm<sup>3</sup> are available.
- Flexible Capacity  
AHF, 25A/35A/50A/60A/75A/100A/150A adapt to cabinet  
SVG, 30kvar/50kvar/100kvar adapt to cabinet  
AHF, SVG module adapt to cabinet
- Flexible incoming connection  
Top / Bottom cable entrance  
Top / Bottom MCCB position

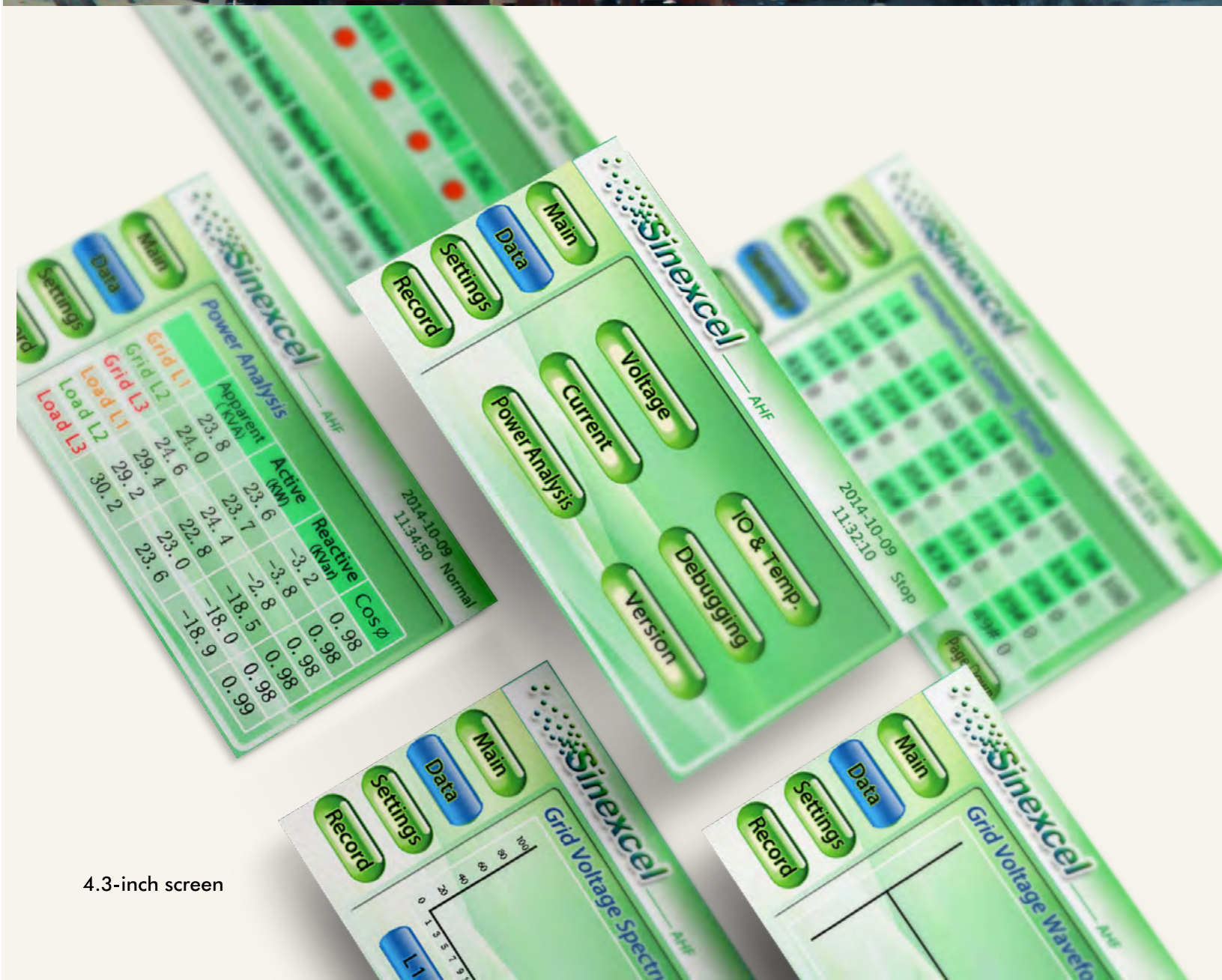


**600mm Flexible Engineering Cabinet**

- Dimension (W\*d\*h) 800\*600\*2200
- Capacity: Maximum Up To 3 Modules (SVG/AHF-400/480/600/690V)
- Power Incoming: Incoming From The Top, Copper Bar Is Not Available



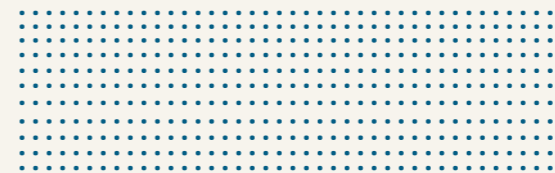
# MONITORING



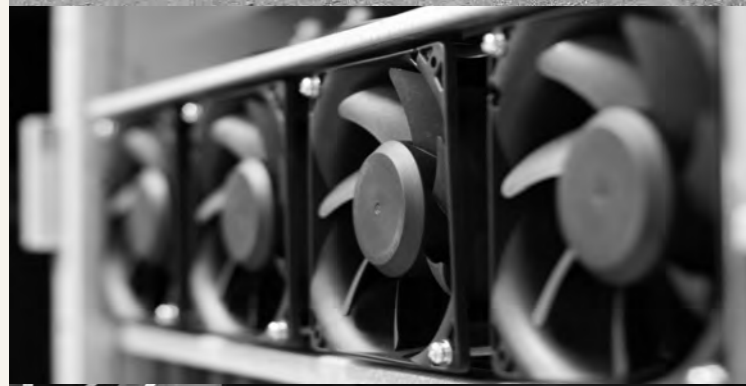
4.3-inch screen



Centralized monitoring System



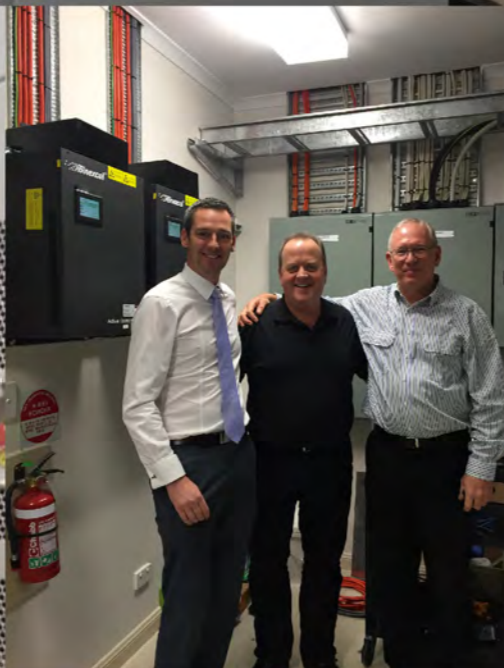
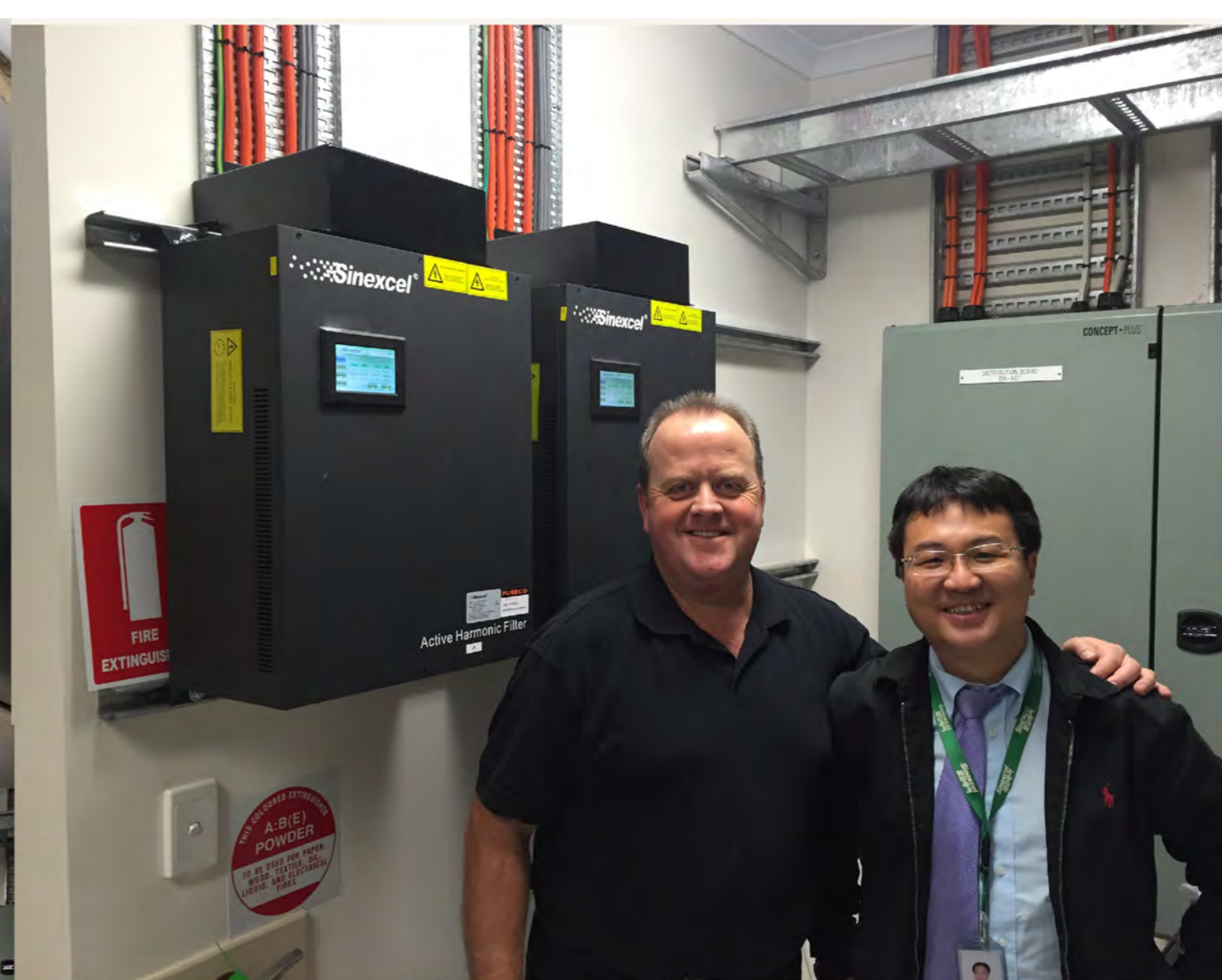




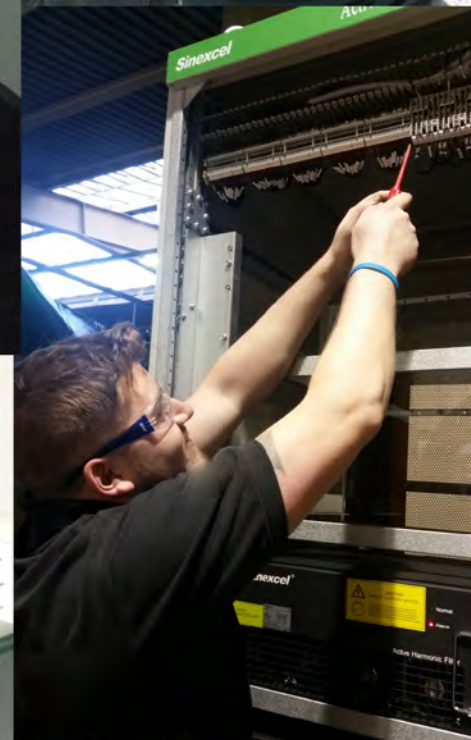
## GLOBAL APPLICATION







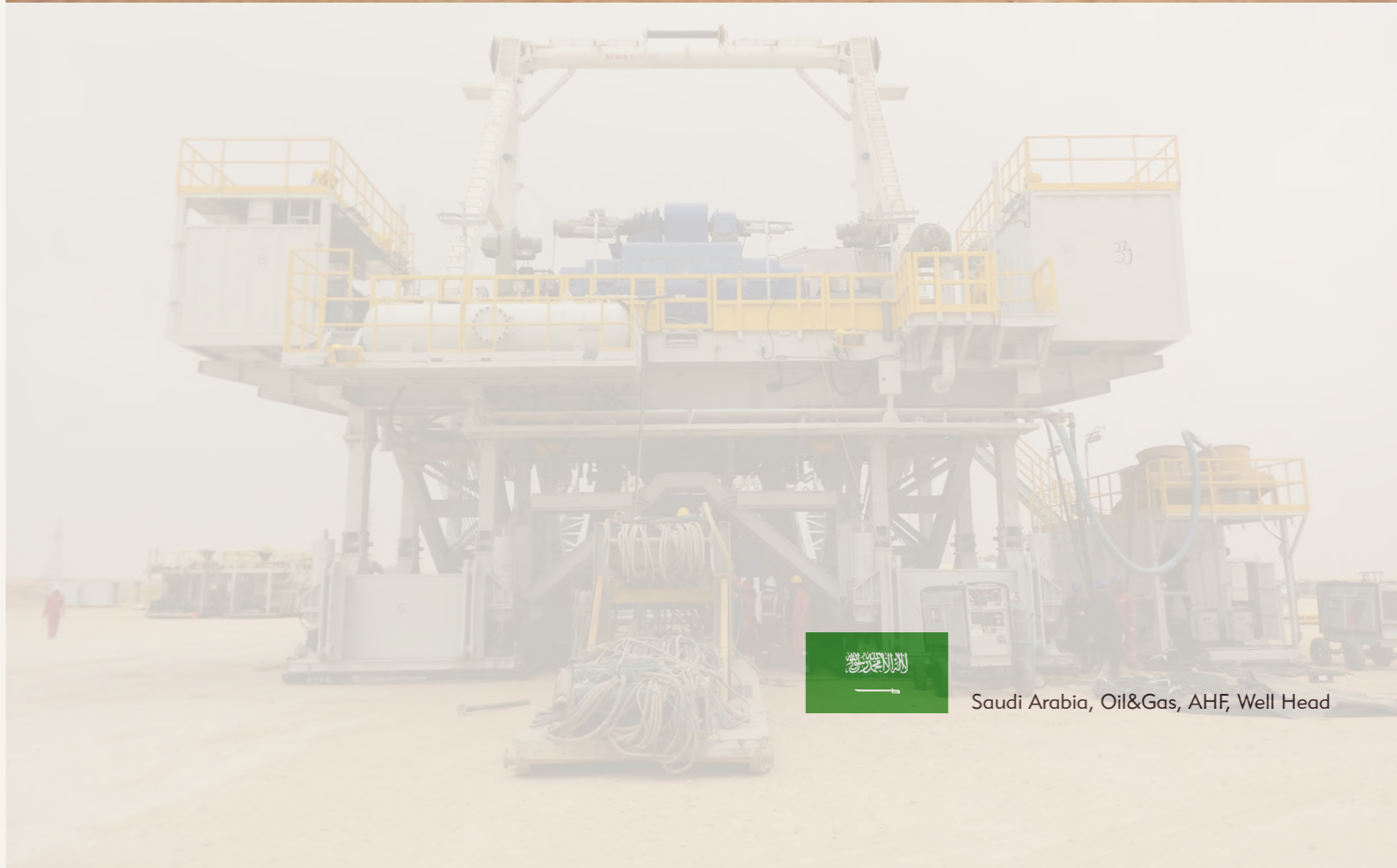
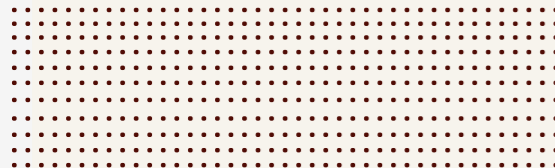
## GLOBAL APPLICATION







Tibet, copper industry , AHF 9900A , SVG 1000kvar



Saudi Arabia, Oil&Gas, AHF, Well Head





The UK, Glabina cheese, AHF 350A



Singapore, CBD Skyscraper Applications, Marina Bay Financial Center Tower, Asia Square Tower, Ocean Financial Center, Keepel Bay Tower, South Beach Tower, Metropolis Tower, Guoco Tower, Duo Tower for the top companies of the world PWC International, Hewlett Packard, Oracle, ABN AMRO Bank, Google, Boeing, lighting, UPS, VFD, harmonic of commercial building, AHF 5000A+







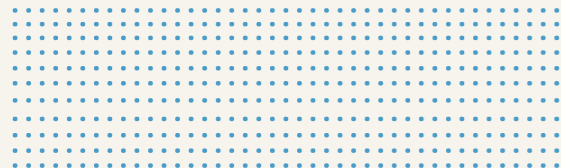
Malaysia, Prime Minister's Department Complex, AHF 125A



China, Changlong Ocean World, Theme Park, Hotel, Shopping mall , AHF 12000A



Canada, Food Product Factory , Hylife Food, 1440A







Australia, Sydney Opera, 200A



Turkey, Ministry of Health of Turkey, UPS, sensitive medical equipment, AHF 1015A

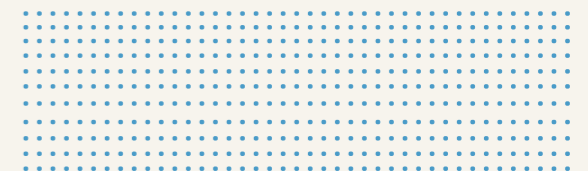




Chile, Food Product Factory, Cecinas Llanquihue, AHF 200A



New Zealand, Irrigation, Central Plains Water, AHF 1340A







## GLOBAL APPLICATION

Sinexcel AHF application covers Asia, Oceania, Europe, Africa,

North America, South America.